

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number
WO 2004/015145 A1

(51) International Patent Classification⁷: C13K 1/02,
C12N 9/42, C12P 7/08, D21C 5/00

(21) International Application Number:
PCT/EP2003/008291

(22) International Filing Date: 28 July 2003 (28.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0218019.8 5 August 2002 (05.08.2002) GB

(71) Applicant (for all designated States except US): CIBA
SPECIALTY CHEMICALS WATER TREATMENTS
LIMITED [GB/GB]; Cleckheaton Road, Low Moor, Brad-
ford, West Yorkshire BD12 0JZ (GB).

(72) Inventor; and

(75) Inventor/Applicant (for US only): HUGHES, Jonathan
[GB/GB]; 6 Lightridge Road, Fixby, Ilkley, West
Yorkshire HD2 2HE (GB).

(74) Common Representative: CIBA SPECIALTY CHEM-
ICALS WATER TREATMENTS LIMITED; Cleck-
heaton Road, Low Moor, Bradford, West Yorkshire BD12
0JZ (GB).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: PRODUCTION OF A FERMENTATION PRODUCT

(57) Abstract: A process of producing fermentation product comprising the steps of, (i) forming an acidified suspension of particulate plant derived material comprising a first polysaccharide which is more readily hydrolysable and a second polysaccharide which is more difficult to hydrolysable, (ii) allowing the first polysaccharide to undergo hydrolysis by action of the acid at a temperature of at least 50°C under conditions such that the first polysaccharide is hydrolysed and thereby forming a mixture of an aqueous liquor containing dissolved sugar and a solid residue containing the second polysaccharide, (iii) subjecting the mixture to one or more separation stages in which the solid residue and aqueous sugar liquor are substantially separated from each other, (iv) optionally washing the residue substantially free of acid and sugar, (v) adjusting the pH of the aqueous liquor to at least 4, (vi) passing the aqueous liquor from step (iv) into a fermentation stage where the dissolved sugars are acted upon by a microorganism in a fermentation broth to produce a fermentation product, (vii) contacting the second polysaccharide by an enzyme, said enzyme hydrolyses the second polysaccharide to the component sugars, and allowing the component sugars to be acted upon by a microorganism in the fermentation broth to produce the fermentation product, (viii) separating the fermentation product from the broth, characterised in that the separation stage(s) in step (iii) is/are assisted by flocculation of the solid by-product, employing one or more flocculating agent(s) selected from the group consisting of water soluble polymers, water swellable polymers and charged microparticulate material. Typically such fermentation products include for instance ethanol, glycerol, acetone, n-butanol, butanediol, isopropanol, butyric acid, methane, citric Acid, fumaric acid, lactic acid, propionic acid, succinic acid, itaconic acid, acetic acid, acetaldehyde, 3-hydroxypropionic acid, glyconic acid, tartaric acid and amino acids such as L-glutaric acid, L-lysine, L-aspartic acid, L-tryptophan, L-arylglycines or salts of any of these acids.

WO 2004/015145 A1